part of the trade, though there is now keen competition among the best makers to secure a high place in the report which is annually issued.

In the opinion of the committee the principles which underlie the proposal for the establishment of a national physical laboratory have been tested on a comparatively small scale at the Kew Observatory with the most satisfactory results.

In addition to the physical constants and numerical *data* needed in connection with standards, there are numerous facts, a knowledge of which would be of great value to science and industry. The determination of such data usually involves an investigation as to the method of making the determination, and a considerable expenditure of skilled labour in carrying out the determination. The committee are of opinion that, although the former part of this work will in general be initiated by individual experimenters of great skill and originality, it may in special cases be usefully undertaken by a public body. It is rather to the improvement in the details of the method of making the determination that they think that the work of a public institution will for the most part be directed. This cannot usually be carried out by private investigators on account of the expense and the length of time over which the experiments must extend. The scientific reputation to be gained is often incommensurate with the labour involved; and even when the results are of industrial importance in many cases they cannot be protected by patents.

There is evidence that many questions of this nature are partially investigated for technical purposes by private persons, the results being not infrequently kept secret. More complete investigations carried out at a public institution and freely published would often be of great service to industry, and there is reason to believe that a large part of the cost of such work might be defrayed by the persons directly interested in the results.

One difficulty in connection with a scheme for the determination of constants and data arises from the fact that the number of subjects which might be pressed for investigation would be very large. The opinion was, however, generally expressed by the witnesses that a strong governing body would have no difficulty in selecting those branches of work which were the most important, and that it would be possible to confine the work of the proposed institution, if established, within moderate limits. Nearly all the witnesses, also, have expressed the opinion that those interested in industry as well as persons devoted to the study of pure science would be willing that the Royal Society should be ultimately responsible for the management of the proposed institution, provided that industry were adequately represented on the governing body, and that the choice of the members of that body, though nominated by the Council of the Royal Society, were not confined to Fellows of the Society.

After consideration of the evidence the committee have come to the conclusion that an institution should be established for standardising and verifying instruments, for testing materials, and for the determination of physical constants. Work useful both to science and industry could therein be performed for which no adequate provision is at present made, either in this country or at the Bureau International des Poids et Mesures. Such work could not, or, at all events, in all probability would not, be undertaken by individual workers, or by institutions primarily devoted to education. In the opinion of the committee the proposed institution should be established at the national expense on lines similar to, though not at present on the scale of, the Physikalisch-technische Reichsanstalt referred to above. The possibility of future extension should, however, be kept in view from the first.

To secure the efficient performance of the work, the committee are of opinion that the director of the institution should be a man of high scientific attainments, and should act under a governing body containing representatives of both science and industry. The director should not be called upon or allowed to undertake work not connected with the institution except with the consent of the governing body. He would require the support of an adequate staff. As regards locality, while it is desirable that the institution should be near London, it is necessary that the site be free from mechanical and electrical disturbance.

Among the most important questions considered by the committee was whether the proposed institution should be founded independently or should be a development of an existing institution. The duties of the Board of Trade, as custodian of certain standards, are defined by statute, and the committee consider that it is undesirable to alter existing arrangements in this respect. They are of opinion that the proposed laboratory if established should be managed by a governing body constituted and appointed as hereinafter described, and should not be under the direct control of a Government department. They recommend that the Board of Trade, as custodian of the standards, should be placed in close connection with the said governing body.

The character of the work done at the Kew Observatory suggests that all that is really necessary might be attained by the development of that institution.

RECOMMENDATIONS.

(1) That a public institution should be founded for standardizing and verifying instruments, for testing materials, and for the determination of physical constants.

(2) That the institution should be established by extending the Kew Observatory in the Old Deer Park, Richmond, and that the scheme should include the improvement of the existing buildings, and the erection of new buildings at some distance from the present observatory.

(3) That the Royal Society should be invited to control the proposed institution, and to nominate a governing body, on which commercial interests should be represented, the choice of the members of such body not being confined to Fellows of the society.

(4) That the permanent secretary of the Board of Trade should be an *ex officio* member of the governing body; and that such body should be consulted by the Standards Office and the Electrical Standardising Department of the Board of Trade upon difficult questions that may arise from time to time or as to proposed modifications or developments.

NOTES.

IN connection with the forthcoming conference upon an International Catalogue of Scientific Literature, a reception will be held at the Royal Society on Monday next, October 10. A dinner has been arranged by the President for Fellows of the Society and their friends who are interested in the subject of the Catalogue. It will take place at the Hôtel Métropole on Tuesday, October 11.

IN connection with the opening of the winter session of the Charing-cross Hospital Medical School on Monday, Prof. Rudolf Virchow, Director of the Berlin Pathological Institute, delivered the second of the Huxley lectures, his subject being "Recent Advances in Science, and their Bearing on Medicine and Surgery." Lord Lister, President of the Royal Society, occupied the chair, and a large number of members of the medical profession, and distinguished men of science were present. Prof. Virchow was most cordially received, and his address, printed in another part of this number, was followed with deep interest and attention.

MR. T. MELLARD READE informs us that the gypsum boulder, weighing at least thirteen tons, found in the Boulder Clay of Great Crosby, and described in a previous number of NATURE (p. 132), has been presented to the District Council by Mr. Peters, and is now being moved from its original bed with the intention of erecting it in an open space in Liverpool Road, Great Crosby. A concrete platform has been prepared to receive the boulder. From the depth of the clay pit in which it lay, and its great weight and irregular form, the lifting, carriage and setting up of the boulder is one of considerable difficulty. The boulder will be protected with wrought-iron railings, and no doubt will prove an object of abiding interest to the neighbourhood and to geologists generally.

NEWS has been received from Sitten (Canton Valais, Switzerland) that, on Monday, Captain Spelterini attempted the passage over the Alps in his balloon the *Vega*. He was accompanied by Prof. Heim, of Zürich, Dr. Mauer, director of the Meteorological Bureau of Zürich, and Dr. Biederman, of Warsaw. The balloon contained 3268 cubic metres of gas, was nearly 200 feet in height, and was capable of carrying a weight of 110,000 kilos, or about 100 tons. Owing to unfavourable winds, the object of crossing the Alps was not attained. The balloon was carried in the wrong direction, and descended near Dijon in France. It reached a height of 6300 metres (20,670 feet).

Attention has already been called to the fact that the executors of the late Baron von Mueller are collecting donations for the erecting upon his grave in the St. Kilda Cemetery, Melbourne, of a monument worthy of his fame. The monument is of grey granite, 23 feet in height, all highly polished, and will stand in the centre of a grave-plot 12 feet square, planted out with choice specimens of the Australian flora. We are now informed that the distinguished phytologist's supplemental volume of the "Flora Australiensis," upon which he had worked for years, and was preparing for the press at the time of his death, is to be published, together with two volumes on his administration as director of the Botanical Gardens, Melbourne, and embracing a biography and complete bibliograph of his writings. The executors would feel favoured by the loan of any of his letters, or the communication of incidents in the Baron's life which friends may deem worthy of notice in the biography. Subscriptions and letters should be addressed "Rev. W. Potter, 'Vonmueller,' Arnold Street, South Yarra, Melbourne, Australia."

We regret to see the announcement of the death of Dr. J. E. T. Aitchison, F.R.S., Brigade-Surgeon (retired) of H.M. Bengal Army, at the age of sixty-three.

Mr. Charles F. Brusch has sent us a copy of a paper read by him before the American Association, on August 23, upon a new gas which he has detected in the atmosphere, and designated *Etherion*. We shall refer to this paper later, when we receive a spectroscopic demonstration of the existence of the new gas.

Referring to the death of M. Gabriel de Mortillet, the well-known naturalist and anthropologist, the *Athenæum* says that he was born in 1821 at Meylan, and educated at Chambéry and Paris. He left France in 1849 to escape imprisonment for a socialistic publication, retiring to Savoy and Switzerland, where he arranged the museums of Annecy and Geneva. In 1856 he took scientific work in Italy; in 1864 he returned to Paris, and founded a periodical dealing with the primitive history of man. Henceforth he was occupied with organising congresses of prehistoric anthropology and archæology. He was appointed curator of the Museum of Antiquities at St. Germain in 1868, and in 1875 he helped to found the Anthropological School at Paris, of which he was subsequently professor. Among his numerous books may be mentioned studies on the mollusca and geology of Savoy, the sign of the cross before Christianity, the potters of the Allobroges, and the prehistoric problem, while his work in learned periodicals was extensive.

An exhibition of optical, mathematical, and scientific instruments is being held this week at the Mansion House, under the auspices of the Worshipful Company of Spectacle Makers, of which the Lord Mayor, Lieut-Col. H. D. Davies, M.P., is the master. The formal opening ceremony was performed on Monday afternoon, under the presidency of the Lord Mayor. The exhibits comprise a number of ancient as well as modern scientific instruments. Mr. Lewis Evans (of King's Langley) displays, *inter alia*, seven astrolabes of the fourteenth to the seventeenth centuries, and a large number of portable sun dials from England, France, Germany, Italy, &c., showing the development of the various types from the fifteenth century to the present time. Among other exhibits are the maximum and minimum thermometers used by Captain Ross in his various voyages round the world. The exhibition will be opened daily until Saturday inclusive, from two o'clock until nine, and a band will play every evening between five and eight o'clock.

The announcement that *Natural Science* will cease at the close of the present year, will be received with regret by students of biological sciences in many parts of the world. The periodical has taken a high place among monthly reviews of scientific progress, and it will be widely missed. The cessation of the journal could be prevented if some one with sufficient time and means will come forward to take over the responsibilities of the present editor, who announces that "all stock, appurtenances, and goodwill" will be handed over to any scientific man who is prepared to take over the responsibility, and continue the journal as an independent organ. It is to be hoped that this opportunity will not be missed, and that the journal will not be permitted to drop out of existence.

An interesting description of the electric railway on the Jungfrau, the first section of which was opened a few days ago, appears in the *Electrician* of September 23 and September 30, and from it we derive the following particulars:—The existing Wengern Alp Railway—a rack and pinion railway driven by steam locomotives—starts from Lauterbrunnen and ascends the Wengern Alp to the Little Scheidegg (an elevation of 6770 feet above sea-level) from whence it descends on the other side of the mountain to Grindelwald. The Jungfrau electric railway starts from the Little Scheidegg station of the Wengern Alp Railway and ascends the Jungfrau from the north side. There will be seven stations in all—namely, Little Scheidegg, Eiger Glacier (7610 feet), Eiger Wand (9220 feet), Eismeer (10,360 feet), Jungfraujoch (11,210 feet), Lift (13,430 feet), Summit of Jungfrau (13,670 feet). On the section of the line already opened there is only a distance of about 85 yards in tunnel, but from the Eiger Glacier onwards the railway will not touch the surface except at the stations. Almost immediately after leaving the Little Scheidegg station the gradient is 10 per cent., and this is increased to 20 per cent. at about half-way to the Eiger Glacier station. From this station the gradient increases to the maximum of 25 per cent. and the line enters the long tunnel, about 450 yards of which has been driven up to the present. The remaining stations from Eiger Wand onwards will be built within the rock, and it is intended to fit them with restaurants and sleeping accommodation for those passengers who may wish to break the journey. From the Eiger Wand and Eismeer stations there will be no egress on to the mountain, and tourists will merely be able to enjoy the view from windows or balconies, but from the Jungfraujoch station it will be possible to go out on to the Jungfraufirn and sledge over the perpetual snowfield to the Aletsch Glacier. The Jungfrau line is one of the most interesting applications of three-phase transmission and distribution yet made. Water-power is made use of in the valley to generate three-phase current at 7000 volts, and this is transmitted by means of overhead wires to transformer stations at the Little Scheidegg and the Eiger Glacier, where it is transformed to 500 volts by means of stationary transformers. Not only is electrical energy employed for traction purposes but also for lighting, heating, and for working the rock-drills used in the tunnels. The permanent way is built on the Strub rack system, and the locomotive truck geared to it carries two induction motors driven directly by the 500-volt three-phase current. The passenger cars, which are not pulled but pushed by the locomotive, are built for forty passengers. It is estimated that the railway will be completed by 1904.

It must now be accepted as one of the established facts of medicine that in almost all outbreaks of human plague rats are affected by a similar disease both before and during the epidemic. In an article upon the plague in Calcutta, Dr. F. G. Clemow points out in the *Lancet* that the evidence that the two diseases are the same is of exactly the same character as that which has established the identity of human and bovine tuberculosis, and there seems to be but little more reason for suspension of judgment in the one case than in the other. It may therefore be accepted that plague in man and plague in the rat are, as far as our present knowledge of the two diseases goes, one and the same disease. Evidence has also been published that the disease may attack other animals than the rat, such as dogs, pigs, pigeons, and domestic fowls. Some interesting evidence pointing to the possibility that rats were the means of introducing the plague infection into Calcutta, is given by Dr. Clemow. Before the date of the first recognised case of plague in man, intimation was received at the Health Office that a number of dead rats had been found in an office situated near the river; and a little later, other dead rats were found in a street close to and parallel with the river and in the warehouses of a shipping company near to the wharfs where ships unload. The occurrence seems to have been so unusual as to have at once attracted attention, and the premises were cleansed and disinfected. Some of these animals were examined at the municipal laboratory, and cultures of the plague bacillus were obtained from them. Right from the beginning of the outbreak dead rats in large numbers have been found in various parts of Calcutta, but more particularly in and near houses where cases of human plague had occurred.

In a report to the Administrator of St. Vincent, dated September 14, Mr. H. Powell, Curator of the Botanic Garden, Kingstown, gives some trustworthy meteorological statistics relating to the recent hurricane in that Colony. He states that the barometer gave timely indication of the coming storm; at 3h. p.m. on September 6 the corrected reading was 29·926 inches, and at 3h. p.m. on the 10th the mercury had fallen to 29·838 inches. This reading caused alarm, and cautionary notices were issued to various centres for dissemination. At 5h. 55m. the next morning the reading was 29·724 inches, and the wind was blowing in fitful gusts from N. and N.W. At 9h. a.m., the usual hour for recording observations, the reading was 29·606 inches, and the wind was rushing from N. to W. At 10h. a.m. the barometer had fallen to 29·539 inches, and the storm had commenced in earnest, the wind blowing from N.N.E. and W., and increased in such force at 11h. a.m. that the largest trees were uprooted. By 11h. 40m. the barometer had fallen to 28·509 inches, after which time there was almost a dead calm for about three-quarters of an hour. The rain gauge was emptied, and 4·94 inches were found to have fallen between 9h. a.m. and noon. At about 12h. 25m. p.m. the wind suddenly commenced to blow from S., and increased in force every minute. Trees and houses which had withstood the first part of the hurricane were now hurled to the ground, the wind force far exceeding that of the forenoon; this continued till about 2h. 30m. p.m., when the wind slackened considerably. During the lull between 11h. 40m. and 12h. 30m. the barometer remained steady at 28·509 inches, and then commenced to rise slowly, and afterwards rose as rapidly as it had previously fallen; at 3h. p.m., the usual recording hour, it had risen to 29·533 inches. Up to this time the rain had fallen in torrents, but the gauge had been overturned. The total rainfall measured was over 9 inches in the twenty-four hours, and it was estimated that another 5 inches was lost by the upsetting of the gauge. Distant thunder and lightning were recorded at intervals during the morning and afternoon. Persons living in St. Vincent who remember the "Great Hurricane" of August 11, 1831, state that the recent one was in every way far more destructive.

By a decree dated August 30 last, the Belgian Government has separated the astronomical from the meteorological service (see Nature, vol. lvi. p. 183), each of these departments being placed under a responsible scientific director; while administrative duties, care of instruments, library, &c., are to be under the control of an inspector. The astronomical service is placed under M. C. Lagrange, and meteorology under M. A. Lancaster, each of whom will submit a report quarterly to the Minister of the Interior upon the work of his particular department.

The record of an active and useful life is contained in a memoir of Dr. T. Sterry Hunt, F.R.S., by Mr. James Douglas, read before the American Philosophical Society in April last, and just published in separate form by Messrs. MacCalla and Co., Philadelphia. As a chemist Dr. Hunt was prominent nearly half a century ago, not only in the field of original investigation, but as one of the first interpreters of the new chemistry then being taught by Gerhardt. As a geologist his work was almost confined to the crystalline and palæozoic rocks, and he brought his chemical knowledge to bear upon the geological problems concerning their genesis. Mr. Douglas's memoir contains a number of interesting notes. The following extract from a letter written by Hunt from Paris in 1855 is of interest in connection with the production and cost of aluminium at the present time:—"I bring you some aluminium with a little note from Ste. Claire Deville, the discoverer. As for aluminium, it is still very rare; perhaps 100 lbs. have been made by Deville for the Emperor, who has defrayed from his own purse the experiments. Rousseau, the greatest fabricant of rare chemicals in France, sells it, however, at three and a-half cents a grain—the price of gold—and everybody buys specimens of it at that price, so that he can hardly supply the demand." In Mr. Douglas, Dr. Hunt's work has found an appreciative recorder.

The British Mycological Society held a most successful meeting, under the auspices of the Dublin Naturalists' Field Club, at Dublin, from September 19–24. Prof. Johnson arranged a most interesting series of excursions to Houth, Powerscourt, Brackenstown, Ballyarthur, The Woodlands, Lucan, and Dunran, and his labours were rewarded by more than 100 species being added to the published list of Mr. Greenwood Pim of "the fungi of the counties of Dublin and Wicklow." Some rare fungi were collected, including *Amanita strobiliformis*, *Naucoria erinacea*, *Polyporus Wynneæ* and *Hypocrea splendens*. Interesting papers were read by the President, Dr. C. B. Plowright, on "Notes and comments on the Agaricineæ of Great Britain," "A clover destroying Fungus," "Eriksson's cereal rusts"; Mr. H. Wager, on "A parasitic fungus on Euglena"; Mr. Greenwood Pim, "Notes on new and rare moulds"; "Dr. McWeeney, "Observations on two sclerotia occurring on the stems of potato"; and Mr. Soppitt, "Notes on rare Uredineæ."

The *Agricultural Gazette of New South Wales* for July contains an interesting account, by Mr. J. H. Maiden, Government Botanist at Sydney, of a botanical exploration of Mount Kosciusko, the highest mountain in Australia, 7328 feet above the level of the sea. Even at midsummer (January 1897) the temperature was only 1·5° above the freezing point at noon, and the climate of the mountain is not adapted for a sanatorium, as has been suggested, owing to the searching south-westerly winds. A list of the species gathered is given, the most largely represented orders being the Rununculaceæ, Leguminosæ, Myrtaceæ, Compositæ, and Gramineæ. There is no mention in the list of any species of Saxifragaceæ or Primulaceæ, and only one each is recorded of Crassulaceæ and Gentianaceæ.

In a "Note on Stokes's Theorem," Mr. A. G. Webster contributes to the *Proceedings* of the American Academy of Arts and Sciences, xxxiii. 20, a very simple proof of the expressions for the components of the curl of a vector point-function in terms of orthogonal curvilinear coordinates, which he obtains without the laborious process of transformation from rectangular axes.

The *Revue générale des Sciences* has brought to light a new student of geometry in the form of Father Cyprien, of the Monastery of Mount Athos. This monk, who turns out to have been formerly a well-known explorer, Prince C. Wiasemsky, contributes to the pages of the *Revue* an interesting note on what he calls the "transinscribed spheres" of regular polyhedra, viz. spheres touching the edges of polyhedra, and various relations between the radii of spheres transinscribed to the regular tetrahedron, cube, octohedron, dodecahedron, and icosahedron are established.

Prof. Oreste Murani contributes to the *Rendiconti* del R. Istituto Lombardo, xxxi. 4, some interesting observations on stationary Hertzian waves as studied with the use of a coherer. The experiments were undertaken with a view of elucidating the phenomenon of multiple resonance indicated by the experiments of Sarasin and De la Rive, who by using resonators of different sizes had obtained indications of waves of different lengths. Instead of a resonator, Prof. Murani used a coherer, whose distance from the metallic reflector could be varied. On the hypothesis that the waves given off by the oscillator were simple waves, it would be natural to expect that the galvanometric deviations due to the coherer should vanish at the nodes and become a maximum at the loops. The actual observations, however, give no indications of such maxima and minima, thus favouring the view that the radiations emitted by the primary are not simple, but are composed of an infinity of waves of different periods.

The invention of the kinematograph has led to a large demand for films, and these of considerably greater length than was previously required. We read in the *British Journal of Photography* (September 23) that the Eastman Kodak Company of Rochester, New York, have contracted to manufacture three photographic films of a length of 50,000 feet each, *i.e.* 9 miles 826 yards 2 feet long. These films have been ordered by Mr. Dunn for use in a machine of the kinetoscope type, the "Cellograph," of which he is the inventor. It is interesting to note the cost of such strips. The Eastman Company, according to the same account, charges 10,000 dollars for each roll, making in all 30,000 dollars for 150,000 feet, or about 1000 dollars a mile. It is possible now literally to take photographs by the mile.

A catalogue of the scientific works in the Royal Zoological Anthropological-Ethnographical Museum in Dresden has been prepared under the direction of Dr. A. B. Meyer, and is published by Messrs. R. Friedlander and Son, Berlin. The works are arranged alphabetically according to authors, and systematically in subjects.

Helminthologists will welcome the contributions to the anatomy and histology of Nemertean worms, which Dr. Böhmig publishes in the current number of the *Zeitschrift für Wissenschaftliche Zoologie.* Two species are described in detail; the one (*Stichostemma græcense*) discovered by Dr. Böhmig himself six years ago in a freshwater pond in the botanic gardens of Graz; and the other (*Geonemertes chalicophora*), found by Prof. von Graff in one of the hot-houses of the same gardens in 1879. The same number of the *Zeitschrift* contains also a paper, by W. Karawaiew, on the changes which the internal organs of ants undergo during their metamorphosis. The observations recorded were made on female larvæ of *Lasius flavus*, and are chiefly of a histological nature.

A paper on induction coils, read by Mr. A. Apps before the Röntgen Society, and one by Dr. J. Macintyre on contact breakers, appear in the *Archives* of the Roentgen Ray (vol. iii. No. 1), together with a report of the discussions which took place upon them at the meeting at which they were read. Unstinted praise is awarded to the excellent mechanical construction and performance of British-made instruments. Thus, "The possessor of a good induction coil made by our leading instrument-makers should cherish it as the violin-player cherishes his Stradivarius or his Guarnerius." Mr. T. C. Porter gives an extended account of his researches on Röntgen rays, already briefly described by him in these columns; Mr. Campbell Swinton summarises some of his recent work; and Drs. Norris Wolfenden and F. W. Forbes-Ross describe the action of Röntgen rays upon the growth and activity of bacteria and micro-organisms.

The second edition of a "Catalogue of Scientific and Technical Periodicals," by Prof. H. Carrington Bolton, has just been published by the Smithsonian Institution. The catalogue contains particulars concerning the principal independent periodicals of every branch of pure and applied science published in all countries from 1665 to the present time. Medicine has been excluded from the list, but anatomy, physiology, and other branches of medical science have been admitted. The periodicals are arranged in alphabetical order, and they number nearly nine thousand. The date of publication of each volume of the journals entered in the catalogue is shown by means of chronological tables, by the use of which it is possible to find the date of a given volume in a given series, or the number of a volume when the date is known. The periodicals are indexed according to subjects, as well as arranged alphabetically according to their titles. The preparation of the volume (which runs into 1247 pages) must have involved an immense amount of work, and men of science will be grateful to the Smithsonian Institution for the new edition of this useful bibliography of the scientific press.

The following are among the forthcoming publications announced by Mr. Wilhelm Engelmann (Leipzig):—"Repetitorium der Zoologie," by Karl Eckstein, second revised edition; "Catalogus Hymenopterorum hucusque descriptorum systematicus et synonymicus," by C. G. de Dalla Torre, Volumen iv. Braconidae; "Monographieen afrikanischer Pflanzen-Familien-und-Gattungen," edited by A. Engler, i. Moraceae (excl. Ficus), prepared by A. Engler; ii. Melastomataceae, prepared by E. Gilg; "Elemente der Mineralogie begründet," by Carl Friedrich Naumann. Thirteenth completely revised edition by Ferdinand Zirkel, second part, completion of the work; "Kritik der wissenschaftlichen Erkenntnis Eine vorurteilsfreie Weltanschauung," by Dr. Heinrich von Schoeler; "Grundriss der Psychologie," by Prof. Wilhelm Wundt, third revised edition; "Untersuchungen über Strukturen," by Prof. O. Bütschli; "Grundriss einer Geschichte der Naturwissenschaften," by Friedrich Dannemann, vol. ii.; "Monographie der Turbellarien," by Ludwig von Graff, vol. ii.; "Handbuch der Blütenbiologie," founded upon Hermann Müller's work, by Paul Knuth; vol. ii. second part, Lobeliaceae bis Coniferae; "Die Vegetation der Erde Sammlung pflanzen-geographischer Monographieen," edited by A. Engler and O. Drude, vol. iii. Caucasus, by G. E. Radde.

Mr. Edward Arnold announces:—"Lectures on Theoretic and Physical Chemistry," by G. R. Van 't Hoff, translated by Prof. R. A. Lehfeldt; "An Experimental Course of Chemistry for Agricultural Students," by T. S. Dymond; "Elementary Physical Chemistry," by Ch. Van Deventer, with an introduction by G. R. Van 't Hoff, translated by Prof. R. A. Lehfeldt; "An Illustrated School Geography," by Dr. Andrew J. Herbertson; and a new edition of "Animal Life and Intelligence," by Prof. C. Lloyd Morgan.—Messrs. G. Bell and Sons' list includes: "Domestic Hygiene," by Dr. W. A. Williams.—Messrs. J. and A. Churchill's announcements include: "A Synopsis of Surgery," by R. F. Tobin; and a new edition of Squire's "Companion to the British Pharmacopœia."—Messrs. Harper and Brothers' list contains: "A Thousand Days in the Arctic," by F. G. Jackson, 2 vols., illustrated.—Mr. W. Heinemann promises: "A View of the World in 1900," a new geographical series, edited by H. J. Mackinder, in 12 vols.: (1) "Britain and the North Atlantic," by the editor; (2) "Scandinavia and the Arctic Ocean," by Sir Clements R. Markham, F.R.S.; (3) "The Mediterranean and France," by Elisée Reclus; (4) "Central Europe," by Dr. Joseph Partsch; (5) "Africa," by Dr. J. Scott Keltie; (6) "The Near East," by D. G. Hogarth; (7) "The Russian Empire," by Prince Kropotkin; (8) "The Far East," by Archibald Little; (9) "India," by Colonel Sir Thomas Holdich; (10) "Australasia and Antarctica," by Dr. H. O. Forbes; (11) "North America," and (12) "South America," by American authorities.—Messrs. Smith, Elder, and Co. will publish: A new edition, with additional plates, of "Electric Movement in Air and Water," by Lord Armstrong, F.R.S.

The additions to the Zoological Society's Gardens during the past week include a Green Monkey (*Cercopithecus callitrichus*) from West Africa, presented by Mr. Cecil Alden: a Ring-tailed Coati (*Nasua rufa*) from South America, presented by Mr. W. C. Way; six Spotted Tinamous (*Nothura maculosa*) from Buenos Ayres, presented by Mr. Ernest Gibson; two Chameleons (*Chamæleon vulgaris*) from North Africa, presented by Mr. W. F. H. Rosenberg; three young Lions (*Felis leo*, ♂ ♂ ♀) from Africa, a Sumatran Rhinoceros (*Rhinoceros sumatrensis*, ♀) from Malacca, two Emus (*Dromæus novæ-hollandiæ*), ten Cunningham's Skinks (*Egernia cunninghami*), a Black and Yellow Cyclodus (*Tiliqua nigro-lutea*) from Australia, a Jardine's Parrot (*Pœocephalus gulielmi*) from West Africa, a Red-sided Eclectus (*Eclectus pectoralis*) from New Guinea, two Reticulated Pythons (*Python reticulatus*) from the East Indies, deposited; a Common Sandpider (*Tringoides hypoleucus*), two Little Ringed Plovers (*Ægialitis curonica*), European, purchased.

OUR ASTRONOMICAL COLUMN.

The Large Sun-spot.—The spot on the solar disc which appeared on September 3 last at the eastern limb, and which, when on the central meridian (September 9), was the probable origin of the aurora and magnetic storm, has again (September 30) made its appearance on the eastern limb, having been of sufficient dimensions to last a period of rotation of the sun. The spot is accompanied by several others of smaller size, and its umbra is divided into three separate parts, which form objects of interesting observation. Even in one day considerable changes have been noted to have taken place in the smaller spots in its neighbourhood, although the large one has not shown any marked change. It will be interesting to know whether another aurora and concurrent magnetic storm will be observed and recorded when the spot reaches the central meridian (which will take place on October 6), as was the case at its last meridian passage.

New Teaching Observatory for the Californian University.—We have received a circular from the director (Mr. A. O. Leuschner) of the students' observatory of the University of California, from which we make the following brief summary:—The trustees of the "Phebe Hearst Architectural Plan for the University of California" have inaugurated an international competition to secure the most suitable plan for the erection of new buildings in place of the present ones on the University grounds at Berkeley. The buildings are to satisfy every need of a modern University of the highest rank. Among these buildings will be an astronomical observatory especially adapted to the training of young men and women for the profession of astronomy in all its branches, and its equipment will be such as best to serve the purposes of the highest instruction in all branches of astronomy. It is stated that the new observatory is not meant to conflict with the Lick Astronomical Department of the University, for there students are only admitted who are supposed to have shown a marked ability for observation and independent research, and who receive from the astronomers a higher inspiration, and are guided by them in their first investigations in such special lines as can be best carried on at the Lick Observatory. While the main feature of the Berkeley department will be to give proper instruction to its students, the equipment of the observatory is proposed to be sufficiently complete to give ample opportunity for the higher work of research that the instructors and advanced students may be in a position to undertake. The object of the circular is, as the writer mentions, "to state in detail my ideas concerning the proposed new observatory, and to seek the advice of men prominent in the science of astronomy and in astronomical instruction elsewhere." That the observatory will be fully equipped and suitable for the work intended to be accomplished there will be little doubt, and the question of cost is evidently a minor detail, for the Trustees of the Plan invite opinion and request "suggestions irrespective of cost which . . . will better adapt the new observatory for the purposes which it is to serve."

Some of the instruments suggested are: an equatorial refractor of an aperture not greater than 16 inches; four smaller telescopes ranging from 6–10 inches aperture, one being a reflector; complete accessories for visual photographic, spectroscopic and photometric work; a 4-inch meridian circle, and four transit and zenith telescopes. The circular gives also details of the sizes of all the rooms for the instruments, laboratories, lectures, library, &c., which it is proposed to build.

Annual Report of the Cambridge Observatory.—In his report to the Observatory Syndicate, which covers a period twelve months ending May last, Sir Robert Ball states that the meridian instrument of the observatory has been devoted especially to the perfection of a complete catalogue (which is ready for the press), by re-observing stars of which a single observation had only been obtained. It has also been employed in the determination of accurate places of a list of occultation stars at the request of Colonel Tupman. The Northumberland equatorial has been occasionally used for examining fixed stars and planets, but is chiefly employed when visitors are admitted.

The work of the Newall telescope has been continued by Mr. H. F. Newall on the same lines as in former years, namely, the determination of the velocities of stars in the line of sight as measured photographically. The stars chiefly used were those of the solar type. In all 111 photographs of sixty minutes' exposure each were obtained, giving material for the determination of velocity of forty-four stars. Twenty of these stars were of magnitudes greater than 2·5, and are included in the Potsdam observations made in 1888–91; the remainder lie between magnitudes 2·5 and 4·0, and were fainter than could be successfully dealt with at Potsdam. Of these plates eighty-three have been measured once, and twenty twice.

The report further states that the new photographic telescope is now finished at Sir Howard Grubb's works, and that the building to house it has been practically completed.

Annual Publication of the Observatory of Rio de Janeiro for 1898.—This yearly publication of the Astronomical Observatory of Rio de Janeiro is the fourteenth of the present series, and will be found to contain a great deal of useful information in addition to the ordinary data usually found in astronomical almanacs. There will be found tables for the reduction of meteorological observations, and for calculating altitudes from barometric observations by the methods of Laplace, Bessel, Cruls, Weilenmann: meteorological observations for several towns, such as Rio de Janeiro, Santa Cruz, Uberaba, contained in Part vi., which also includes the magnetic ele-